Infrared Measurements in the Spring 1987 Ozone Hole

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Solar spectra were recorded from Arrival Heights (McMurdo), Antartica, with the University of Denver FTIR system (.02 cm^{-1} apodized resolution) during the austral spring of 1987. Spectra were recorded on 22 days from September 13 through October 28. The instrument was setup with 2 detectors for simultaneous operation in 2 wavelength regions: 750-1250 cm^{-1} (HgCdTe) and 2700-3100 cm^{-1} (InSb). Several stratospheric gases have measurable absorptions in these regions including HCl, HNO_3, O_3, $ClONO_2$, and NO_2. The system is equipped with an automatic solar tracking system and records data on tape cartridges. A portable personal computer allows Fourier transforming and initial processing of some of the data.

The equipment and personnel arrived during WINFLY in late August. Although the equipment was operational in early September, the weather prevented observations until September 13. Data were taken during clear periods until the drive mechanism failed after the run on October 28.

The HNO_3 gas column amount shows large variations, but no apparent correlation with stratospheric temperature. The HCl column shows a steady increase from 0.9 x 10^{15} molecules/cm^2

on September 13 to 1.5 x 10^{15} on October 6. McMurdo moved out of the polar vortex for a few days, and the HCl column jumped to 2.9 x 10^{15} by October 11. Although McMurdo moved back under the vortex, the HCl continued to increase, reaching 3.4 x 10^{15} at the end of the period.